

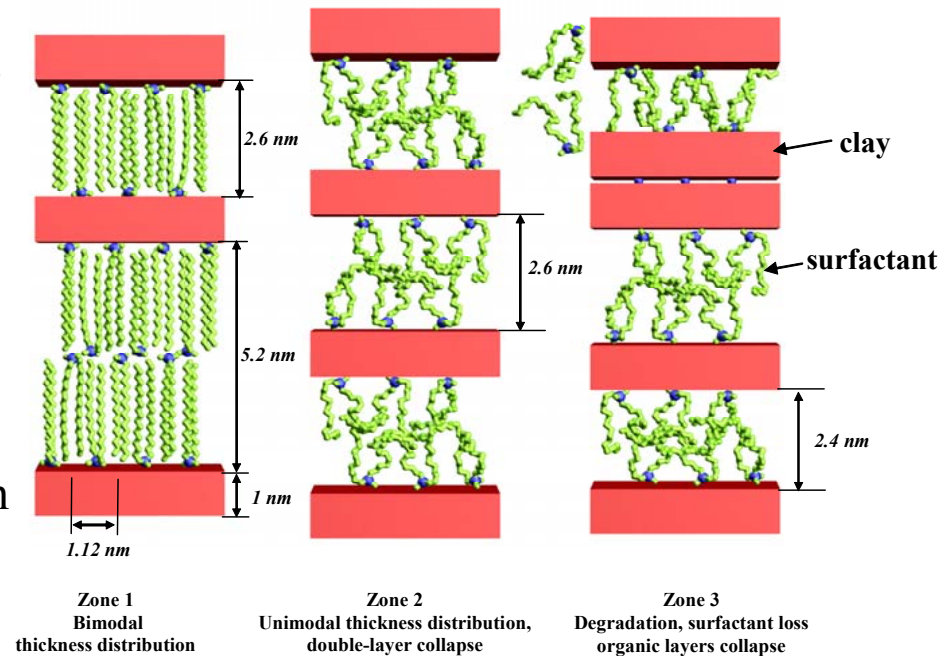
Inter-American Materials Collaboration between U.S. and Mexico

Novel Preparation and Characterization of Polymeric Nanocomposites

Benjamin S. Hsiao and Benjamin Chu, Stony Brook University, DMR-0302809

This project brought together two research laboratories from the Stony Brook University in the U.S. and the Autonomous University of San Luis Potosí in México to study several fundamental issues of polymer and clay nanocomposites that can have potential applications of benefits to both countries. These issues include the development of new pathways to prepare polymer-clay nanocomposites with direct commercialization importance, the applications of advanced in-situ characterization methods (X-ray, Raman and rheology) to understand the structure and property relationship during processing, and the modeling of clay morphology in nanocomposites based on in-situ X-ray, Raman and rheological studies.

**Langmuir*, 20(9), 3746-3758 (2004).



The proposed morphological model for organoclays (green chains represent surfactant molecules and pink bars represent clay particles) in three temperature zones based on in-situ synchrotron X-ray and Raman data. The stability of surfactant is a major issue in preparation of polymer nanocomposites using organoclays.*

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Education and Outreach:

Currently, one Ph.D. graduate student: Mr. Pranav Nawani (3rd year) and two post-doctoral scientists: Dr. Michael Gelfer and Dr. Carlos Avila-Orta are involved in this project at Stony Brook.

The Mexican team has already visited Stony Brook twice, which included a month stay in November, 2003, by two graduate students (Mr. Jose M. Mata-Padilla and Mr. Leonardo Aurelio Baldenegro-Pérez) and a one-week visit by Prof. Medellin-Rodriguez in March, 2004. During both trips, the Mexican team members have carried out synchrotron X-ray studies at the National Synchrotron Light Source, Brookhaven National Laboratory. The US team is planning to visit Mexico in the later part of 2004.



Dr. Michael Gelfer demonstrated the rheological characterization techniques of clay-based nanocomposites to a visiting scientist from Greece, Dr. Antonios Kalarakis